CALTRANS DIVISION OF RESEARCH AND INNOVATION

# DRI GOODS MARKETPLACE

## FRESH IDEAS IN TRANSPORTATION - DAILY!

VOLUME 1, ISSUE 1 MAY 2007

## VII CALIFORNIA TO CONTRIBUTE TO NATIONAL PROGRAM

The U.S. DOT recently added Caltrans' Vehicle Infrastructure Integration (VII) California testbed to the national VII effort, providing Caltrans and its partners the opportunity to go online with "standardized" or common hardware and software to conduct experiments that both translate into and scale with U.S. DOT experiments in Michigan and Washington D.C.

**What is VII?**

The VII vision is that every car manufactured in the U.S. would be equipped with a communications device and a GPS unit so that data could be exchanged with a nationwide, instrumented roadway system. Data transmitted from the roadside to the vehicle could warn a driver that it is not safe to enter an intersection. Vehicles could serve as data collectors and anonymously transmit traffic and road condition information from every major road within the transportation network. Automobile manufacturers could more quickly notify drivers of warranty or recall needs. These and many more outcomes can be realized through the Vehicle Infrastructure Integration initiative. The National VII Coalition has been established to determine the feasibility of widespread deployment and to establish an implementation strategy. The Coalition consists of automobile manufacturers, AASHTO, ten state departments of Transportation, and the U.S. DOT.

**The Caltrans Component**

Recognizing the value of VII as a potential solution to transportation challenges that affect mobility, Caltrans established the VII California Testbed. Through the collaborative efforts of Caltrans, Metropolitan Transportation Commission (MTC); BMW North America; DaimlerChrysler Research; Engineering and Design North America; Toyota InfoTechnology Center and Volkswagen of America Electronics Research Laboratory, the testbed would test VII feasibility to "pave the way" for VII implementation.

Currently, the VII California Testbed consists of approximately 60 miles of roadway (including freeways and arte-

*(Continued on page 3)*

### TODAY'S SPECIALS



## RESEARCH CONNECTION EXPLORES HUMAN BEHAVIOR

On Thursday, May 24th, DRI's Research Connection Event featured Dr. Delphine Cody. Delphine Cody is a Psychologist at the California California Partners for Advanced Transit and Highways (PATH) program at UC Berkeley. Her role is to apply her knowledge of drivers' cognition and behavior to transportation safety issues.

Since joining PATH she has been involved in driver models development, evaluation of a Cooperative Adaptive Cruise Control, description of driver behavior at intersection supporting the development of driver decision support systems and development of a prototype of a Driver's Situation Awareness Support system.

For more information on Research Connection Events, please visit the Research Connection Website!

Ms. Delphine Cody
Psychologist
California PATH

# The Deployment Central Branch

The Deployment Central Branch works with project managers in the implementation of transportation research and innovation including products and services that improve the efficiency, safety, and security of the transportation system and that support the Caltrans strategic goals.

Here you will find a sampling of deployed, soon to be deployed and commercialized products developed through the Division of Research and Innovation.

For more information on these and other products, please visit Deployment Support

## BALSI BEAM

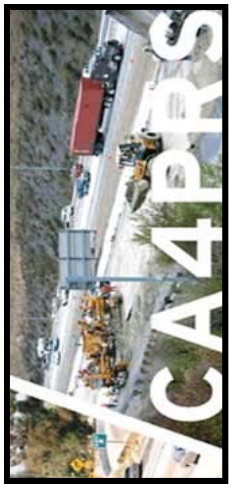
**Deployed**

Over the years many Caltrans employees have been seriously injured or lost their lives while working on or near California State highways. The Caltrans Division of Equipment developed a truck-mounted, expandable beam that will provide work zone protection comparable to a concrete barrier. The system consists of a tractor-trailer combination, where the trailer extends and transforms into a 30-foot long work zone protector. The Mobile Work Zone Protection Device is now deployed in the field by the Caltrans Maintenance Division to gain experience in its operation and evaluate its performance.

The Balsi Beam was accepted by the American Association of State Highway and Transportation Officials (AASHTO) Technology Implementation Group (TIG). The TIG helps develop a process to prioritize and select technologies on which to focus implementation efforts and solicit potentially ready to implement technologies.

For more information on Balsi Beam visit Click Here.

**Deployed**




## CONSTRUCTION ANALYSIS FOR PAVEMENT REHABILITATION STRATEGIES (CA4PRS)

CA4PRS is designed to identify optimal rehabilitation solutions that balance on-schedule construction production, traffic inconvenience, and agency costs.

An additional benefit is attained when CA4PRS results are integrated with macroscopic and microscopic traffic simulation tools for estimating road user delay costs that arise from construction.

During the design and construction phases of highway rehabilitation projects, CA4PRS helps transportation agencies, contractors, and consultants develop staging construction plans, establish CPM schedules, estimate cost (A) + schedule (B) contracts and calculate incentive/disincentive specifications .

For more information on CA4PRS Click Here.

## BRIDGE HEIGHT MEASURING SYSTEM

Researchers have developed a prototype system for on-the-fly bridge profile sensing. The vehicle-based sensing system uses a scanning laser to measure range and reflected power from the bridge and the roadway. The operation occurs at highway speed; i.e., with no fixed or rolling closure.

The laser data is analyzed by custom software to determine bridge height measurements, as well as lane widths and other horizontal dimensions. The software includes a user interface for interactive fine-tuning of the results. These dimensions can then be used to update a two-dimensional profile of the bridge and the corresponding databases in support of overheight vehicle permitting.

For more information on this product Click Here.

Future Deployment

## AUTOMATED CONE MACHINE

Commercialized

Currently, traffic cones are deployed by a person riding on the exterior of a modified vehicle. This person is typically either standing in a basket at the end of a truck or sitting near ground level between the axles of the customized cone body truck. On the current cone truck, two horizontal stacks of cones are fed by conveyor to a worker who then places or retrieves the cones while another person drives the vehicle.

A machine has been developed that can automatically place and retrieve traffic cones. This machine fits onto existing traffic cone trucks and all operations are controlled from within the cab by either the driver or a second operator.

The machine places cones in the forward travel direction and retrieves them in either forward or reverse directions at speeds up to 10 mph. The machine is designed so that no on-site set-up is required, and both deployment and stowage of the mechanism is simple and fast. The entire operation is under control of the driver, who remains in the truck cab during both deployment and retrieval. The machine is designed so that manual operation, as currently performed, is still be possible in the event of unusual circumstances.

The product has been commercialized by the company TRAF-tech: Traffic Management Equipment.

## VII CONT

*(Continued from page 1)*

rials), a network of 12 Dedicated Short Range Communication (DSRC) roadside units, light duty and transit vehicles equipped with on-board communication equipment and applications, and a leveraged, established backhaul network consisting of heterogeneous backlinks, T1 wireline, 3G modem and WiMax). California Partners for Advanced Transit and Highways (PATH), located at University of California, Berkeley, is working with Caltrans on the infrastructure (roadside unit) implementation and vehicle-infrastructure messaging and communication of the VII data. Telvent Farradyne is working with MTC on backhaul communications and collection, processing and archiving of data at the center.

**Ultimate Goal**

The ultimate goals of the VII California program are to better manage the safety and productivity of the surface transportation system; combine the resources, expertise, and innovations of the public sector, the auto industry, aftermarket suppliers, and other private sector participants for the benefit of the traveling public; build upon California's already considerable existing infrastructure investments; and create opportunities for innovation in the transportation system, exploring commercial uses of the system to fund its deployment and operation.

For more information on VII California - Click Here.


[Current DRI Research Reports]

[Research Summaries]

[AHMCT]

[ATMS Testbed]

[California PATH]

[California Center for Innovative Transportation]

[Cooperative Vehicle-Highway Automation Systems]

[Intelligent Vehicle Initiative]

**Institutes of Transportation Study**

[UC Berkeley]

[UC Davis]

[UC Irvine]

[UCLA]

**University Transportation Centers**

[Metrans]

[Mineta]

[UCTC]

[UC Davis]

[STC]

# UCPRC UPDATE

Field and laboratory work under the Partnered Pavement Research Program — managed by Caltrans Division of Research and Innovation (DRI) and performed by the University of California Pavement Research Center (UCPRC) — continues to bring results that support the Pavement Research Roadmap. The program has recently produced a variety of publications based on its work, including design guides, research reports, and technical memoranda.

The Roadmap includes projects that improve the understanding of the diverse pavement problems related to corrosion resistance of steel dowels and that develop tools to help test and monitor pavement preservation innovations. In support of this, UCPRC published a research report and two guides:

*Laboratory Evaluation of Corrosion Resistance of Steel Dowels in Concrete Pavement* (UCPRC-RR-2005-10)

A full version and a summary version of the *Pavement Preservation Studies Technical Advisory Guide* (UCPRC-GL-2005-01 and UCPRC-GL-2005-02).

Another problem identified in the Roadmap is the impact on roadway traffic associated with frequent construction and maintenance activities. To address problem, UCPRC performed tests using the Heavy Vehicle Simulator (HVS) to identify structural designs and construction practices that significantly increase the service life of pavements. Results are presented in the report:

*Construction and Test Results on Dowel Bar Retrofit HVS Test Sections 556FD, 557FD, 558FD, and 559FD: State Route 14, Los Angeles County at Palmdale* (UCPRC-RR-2006-02).

The UCPRC supports Caltrans' adoption (in 2005) and long-term implementation of the mechanistic-empirical design method. Research is adding knowledge and will produce software tools that will rely on engineering mechanics for design and analysis of pavement performance. The ability to predict pavement life and associated life-cycle costs also will support Caltrans' Pavement Management System. Evaluations and design tools are documented in these publications:

*Sample Rigid Pavement Design Tables Based on Version 0.8 of the Mechanistic Empirical Pavement Design Guide.* (UCPRC-TM-2006-04)

*Calibration of Incremental-Recursive Flexible Damage Models in CalME Using HVS Experiments.* (UCPRC-RR-2005-06.)

*Sensitivity Analysis of 2002 Design Guide Rigid Pavement Distress Prediction Models* (UCPRC-DG-2006-01).

These items can be obtained from the [UCPRC web site] or from Caltrans Contract Manager [Michael Samadian] .

# DRI FEEDBACK

**Question, comment, concern:**

PLEASE PRINT

**DROP YOUR COMMENTS IN FEEDBACK BOX AT FRONT RECEPTION DESK**

**THANK YOU**

# DRI Events

## June 2007

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| | | | | | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 HVSIA | 21 HVSIA | 22 HVSIA | 23 |
| 24 11th World Conference | 25 11th World Conference | 26 11th World Conference | 27 11th World Conference | 28 Research Connection | 29 | 30 |

## July 2007

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 Research Connection | 27 | 28 |
| 29 | 30 | 31 | | | | |

**CALTRANS**
**DIVISION OF RESEARCH AND INNOVATION**

1227 O Street
Veterans Affairs Building - 5th Floor
Sacramento, CA 94273
916-654-8899

**Larry Orcutt**
Division Chief

**Kelly Brooks**
Office of Management Support

**Nancy Chinlund**
Office of Policy, Planning and Innovation

**Greg Larson**
Office of Traffic Operations

**Nick Burmas**
Office of Materials and Infrastructure

**Homar Noroozi**
Office of Technology Applications

**Wes Lum**
Office of National Liaison

**Ramez Gerges**
Office of Communications Systems Research

HTTP://WWW.DOT.CA.GOV/NEWTECH/INDEX.HTM

# Why DRI?

**The purpose of the California Department of Transportation (Caltrans) Division of Research and Innovation (DRI) is to stimulate innovation by performing applied, customer-developed and focused transportation research that yields tangible products and improved processes that enhance mobility across California. Innovations in methods, materials, technologies, policies, and practices enable Caltrans to effectively use and manage public facilities and services, protect public investment in transportation infrastructure, and enhance and expand mobility options. The DRI is responsible for administering Caltrans research program and is comprised of six offices: Materials and Infrastructure; Management Support; National Liaison; Planning, Policy, and Innovation; Technology Applications and Traffic Operations Research.**

**DRI seeks to take full advantage of strategic opportunities to find low-cost, public, and private solutions that substantially increase the value of taxpayer dollars invested in present and future public infrastructure, and make California's technological industries competitive in emerging global transportation technology markets. With direction from Caltrans Research and Deployment Steering Committee (RDSC), a committee comprised of district directors and deputy directors, DRI: Establishes and facilitates the process to identify, select, program, manage, and implement research; meets all federal-aid program requirements, including the preparation and maintenance of the Caltrans Research Manual and the State Planning and Research (SPR) Part II, Annual Work Program; sets the research agenda based on the involvement and participation of its internal and external customers; performs and develops applied transportation research for all modes of transportation; provides technical assistance to its customers to deploy transportation research products; engages in both short- and long-term research; manages research projects and obtains funding for the research.**